

# **GOLF CLUB HEAD**

## **BACKGROUND OF THE INVENTION**

### **1. Field of the Invention**

The present invention relates to a golf club head. In particular, the  
5 present invention relates to a golf club head with improved structural strength.

### **2. Description of Related Art**

Fig. 1 is a sectional view of a conventional golf club head. Fig. 1a is  
an enlarged view of a circled portion in Fig. 1. The golf club head 1 is made of  
10 metal and includes a golf club head body 10, a striking plate 11, a perimeter wall 12, a hosel 13, and a vibration-absorbing plate 14. The striking plate 11 is mounted to a front side of the golf club head body 10 for striking a golf ball. The perimeter wall 12 is a wall that extends rearward along a perimeter of the golf club head body 10 and forms an opening 121 in a back of the golf club  
15 head body 10. A shaft (not shown) is engaged with the hosel 13. The vibration-absorbing plate 14 is made of rubber or carbon fiber and bonded by glue to a back of the striking plate 11 for absorbing vibrations generated as a result of striking a golf ball.

As illustrated in Fig. 1a, if the striking plate 11 is mounted to an  
20 engaging portion 101 of the golf club head body 10 by welding, brazing, insertion, or pressing, an engaging edge 111 (such as a welding bead, an outflow of the material for brazing, an insertion area, or a pressing area) is

formed in a joint area between the striking plate 11 and the golf club head body 10. When striking a golf ball, the resultant vibrations may cause a stress concentration around the engaging edge 111. The result of long-term stress concentration in the engaging edge 111 is cracks in the engaging edge 111, adversely affecting the structural strength of the golf club head 1. Although a vibration-absorbing plate 14 is bonded to the golf club head body 10, the bonding arrangement results in a gap 142 between the vibration-absorbing plate 14 and the golf club head body 10. The vibration-absorbing plate 14 could not absorb the concentrated stress due to existence of the gap 142; namely, the vibration-absorbing efficiency of the vibration-absorbing plate 14 is adversely affected by the gap 142. Further, the back of the striking plate 11 is not supported and thus must have a relatively large thickness to prevent from permanent deformation that may occur after long-term use. However, the deformability of the striking plate 11 is adversely affected if it is too thick. This adversely affects the efficiency of transmitting the momentum to the golf ball and causes vibrations of the golf club head body 10. The striking effect and the striking stability of the golf club head 1 are greatly and adversely affected.

### OBJECTS OF THE INVENTION

An object of the present invention is to provide a golf club head with improved structural strength by means of providing a reinforcing layer on a back of a striking plate.

Another object of the present invention is to provide a golf club head with improved vibration-absorbing effect, improved striking stability, and improved gripping comfort.

### SUMMARY OF THE INVENTION

5 In accordance with an aspect of the present invention, a golf club head includes a golf club head body, a striking plate mounted to a front side of the golf club head body, and a reinforcing layer formed on a back of the striking plate. A perimeter wall extends rearward along a perimeter of the golf club head body. An engaging edge is formed in a joint area between the striking  
10 plate and the perimeter wall. The reinforcing layer completely covers the engaging edge to improve the structural strength of the golf club head and to absorb vibrations generated as a result of striking a golf ball.

Other objects, advantages and novel features of this invention will become more apparent from the following detailed description when taken in  
15 conjunction with the accompanying drawings.

### BRIEF DESCRIPTION OF THE DRAWINGS

Fig. 1 is a sectional view of a conventional golf club head;

Fig. 1a is an enlarged view of a circled portion in Fig. 1;

Fig. 2 is a rear perspective view of a first embodiment of a golf club  
20 head in accordance with the present invention;

Fig. 3 is a sectional view of the golf club head in Fig. 2;

Fig. 3a is an enlarged view of a circled portion in Fig. 3;

Fig. 4 is a rear perspective view of a second embodiment of the golf club head in accordance with the present invention;

Fig. 5 is a sectional view of the golf club head in Fig. 4;

Fig. 5a is an enlarged view of a circled portion in Fig. 5;

5 Fig. 6 is a rear perspective view of a third embodiment of the golf club head in accordance with the present invention;

Fig. 7 is a sectional view of the golf club head in Fig. 6;

Fig. 8 is a rear perspective view of a fourth embodiment of the golf club head in accordance with the present invention;

10 Fig. 9 is a sectional view of the golf club head in Fig. 8;

Fig. 10 is a rear perspective view of a fifth embodiment of the golf club head in accordance with the present invention;

Fig. 11 a sectional view of the golf club head in Fig. 10;

15 Fig. 12 is a rear perspective view of a sixth embodiment of the golf club head in accordance with the present invention; and

Fig. 13 is a sectional view of the golf club head in Fig. 12.

#### DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

Preferred embodiments of the present invention are now to be described hereinafter in detail, in which the same reference numerals are used  
20 in the preferred embodiments for the same parts as those in the prior art to avoid redundant description.

Referring to Figs. 2, 3, and 3a, a first embodiment of a golf club head

1 in accordance with the present invention includes a golf club head body 10 having an engaging portion 101 on a front side thereof. A striking plate 11 is mounted to the engaging portion 101 of the front side of the golf club head body 10 for striking a golf ball. The striking plate 11 can be mounted to the engaging portion 101 of the golf club head body 10 by insertion, pressing, brazing, welding, and screwing. Alternatively, the striking plate 11 can be directly and integrally formed with the golf club head body 10 as a single member.

A perimeter wall 12 extends rearward along a perimeter 18 of the golf club head body 10 and defines an opening 121 in a back of the golf club head body 10. A hosel 13 is formed on a side of the golf club head body 10 and engaged with a shaft (not shown). The golf club head body 10 (excluding the striking plate 11) can be integrally formed by means of precision casting, casting, mechanical processing, pressure-casting, forging, or injection molding. Alternatively, the golf club head body 10 can be made by means of section-by-section engagement.

A reinforcing layer 15 is located in the opening 121 and tightly bonded to a back of the striking plate 11. The reinforcing layer 15 is substantially a plate and preferably made by means of heat pressing or injection molding so as to be integrally and tightly bonded to the back of the striking plate 11. The reinforcing layer 15 is a layer of light and reinforced material selected from a group consisting of carbon fibers, resins (such as

epoxy resins), high molecular polymer materials, rubber, light alloys (such as titanium alloys or aluminum alloys), and adhesive composite powders thereof.

As illustrated in Fig. 3a, the reinforcing layer 15 can be tightly bonded  
5 to the back of the striking plate 11, no adhesive is required, as the reinforcing layer 15 is bonded to the back of the striking plate 11 by means of heat pressing or injection molding. Further, an engaging edge 111 (such as a welding bead, an outflow of the material for brazing, an insertion area, or a pressing area) formed in a joint area between the striking plate 11 and the golf club head body 10 is completely covered by the reinforcing layer 15. Thus,  
10 when striking a golf ball, the stress concentrated on the engaging edge 111 can be absorbed by the reinforcing layer 15, avoiding generation of cracks in the engaging edge 111 as a result of long-term stress concentration on the engaging edge 111. The engaging relationship between the striking plate 11 and the golf club head body 10 is improved, and the life of the golf club head  
15 1 is prolonged. The reinforcing layer 15 directly absorbs vibrations of the striking plate 11 when striking a golf ball. Accordingly, the reinforcing layer 15 provides the golf club head 1 with improved structural strength, improved vibration-absorbing effect, improved striking stability, and improved gripping  
20 comfort. Further, the reinforcing layer 15 supports the striking plate 11, which allows use of a striking plate 11 of a relatively small thickness. This increase the transition deformability of the striking plate 11 and thus improves the

striking effect (i.e., the flying distance of the golf ball stricken by the golf club head 1 is increased).

Figs. 4, 5, and 5a illustrate a second embodiment of the golf club head in accordance with the present invention. In this embodiment, the reinforcing layer 15 has a perimeter extension 151 that extends rearward along a perimeter thereof and that covers an inner face of the perimeter wall 12, forming a vessel-like structure. The reinforcing layer 15 and the perimeter extension 151 are formed by heat pressing or injection molding and tightly and integrally bonded to the back of the striking plate 11 and the inner face of the perimeter wall 12, respectively. As illustrated in Fig. 5a, the reinforcing layer 15 can be tightly bonded to the back of the striking plate 11, no adhesive is required, as the reinforcing layer 15 is bonded to the back of the striking plate 11 by means of heat pressing or injection molding. Thus, when striking a golf ball, the resultant vibrations of the striking plate 11 can be directly absorbed by the reinforcing layer 15. Accordingly, the reinforcing layer 15 provides the golf club head 1 with improved structural strength, improved vibration-absorbing effect, improved striking stability, and improved gripping comfort.

Figs. 6 and 7 illustrate a third embodiment of the golf club head in accordance with the present invention that is modified from the first embodiment. In this embodiment, a main striking area 152 of the back of the striking plate 11 (which corresponds a main striking area in the front face of

the striking plate 11 for striking a golf ball) is not covered by the reinforcing layer 15. This provides the main striking area 152 of the striking plate 11 with a maximized deformability, increasing the flying distance of the golf ball stricken by the golf club head 1. Further, the reinforcing layer 15 improves the bonding strength between the striking plate 11 and the golf club head body 10, absorbs vibrations generated as a result of striking a golf ball, and supports the striking plate 11.

Figs. 8 and 9 illustrate a fourth embodiment of the golf club head in accordance with the present invention that is modified from the second embodiment. In this embodiment, a main striking area 152 of the back of the striking plate 11 is not covered by the reinforcing layer 15. This provides the main striking area of the striking plate 11 with a maximized deformability, increasing the flying distance of the golf ball stricken by the golf club head 1. Further, the perimeter extension 151 of the reinforcing layer 15 improves the bonding strength between the striking plate 11 and the golf club head body 10, absorbs vibrations generated as a result of striking a golf ball, and supports the striking plate 11.

Figs. 10 and 11 illustrate a fifth embodiment of the golf club head in accordance with the present invention that is modified from the second embodiment. In this embodiment, the perimeter wall 12 includes a perimeter flange 122 extending inward along a rear end edge of the inner face thereof. When forming the reinforcing layer 15 and the extension 151 by means of

heat pressing or injection molding, a rear end of the perimeter extension 151 is directly and tightly engaged to an inner side of the perimeter flange 122. The perimeter flange 122 prevents the reinforcing layer 15 and the perimeter extension 151 from moving outward and thus prevents the reinforcing layer 15 and the perimeter extension 151 from disengaging from the opening 121 of the golf club head 1. When the striking plate 11 is bearing a striking stress, the perimeter flange 122 firmly supports the extension 151 and thus provides an improved supporting effect for the striking plate 11.

Figs. 12 and 13 illustrate a sixth embodiment of the golf club head in accordance with the present invention that is modified from the second embodiment. In this embodiment, in addition to the perimeter extension 151 of the second embodiment (Figs. 4, 5, and 5a), the golf club head 1 also includes the perimeter flange 122 of the fifth embodiment (Figs. 12 and 13) and the hole 152 of the third embodiment (Figs. 6 and 7). Further, a plurality of areas 153 of the inner face of the perimeter wall 12 are not covered by the extension 152. Each area 153 may be semicircular, semi-oval, triangular, square, swirl-like, or droplet-like. The amount of light material can be reduced and an aesthetic appearance of the golf club head 1 can be provided without adversely affecting the structural-strengthening effect, the vibration-absorbing effect, and the supporting effect mentioned above.

While the principles of this invention have been disclosed in connection with specific embodiments, it should be understood by those

skilled in the art that these descriptions are not intended to limit the scope of the invention, and that any modification and variation without departing the spirit of the invention is intended to be covered by the scope of this invention defined only by the appended claims.